

REMARKS

Applicants have made minor amendment to claim 53 for reasons unrelated to patentability to simply move the phrase, “but not a substantially ocular region” which was after the phrase, “of a human subject” to before that phrase. As set forth in greater detail below, Applicants respectfully traverse the Office’s rejection of claims 53-57. In view of the following remarks, Applicants hereby request further examination and reconsideration of the application, and allowance of claims 53-57.

The Office asserts the information disclosure statement filed on October 27, 2003 fails to comply with 37 CFR 1.98(a)(2). Accordingly, Applicants have submitted a supplemental information disclosure statement which is now believed to be in compliance with 37 CFR 1.98(a)(2). Accordingly, in view of the foregoing remarks, the Office is respectfully requested to withdraw its objection to the information disclosure statement.

The Office has rejected claims 53-57 under 35 U.S.C. 101 and under 35 U.S.C. 112, first paragraph, asserting the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility and that one skilled in the art would not know how to use the present invention. The Office asserts that, “Absence of Circadian Phase Resetting in Response to Bright Light Behind the Knees” by Wright Jr. and Czeisler (Science Magazine 297 (5581):571) discloses a specific attempt to replicate the current invention without respect.

Applicants respectfully traverse the Office’s rejections. The Office’s attention is respectfully directed to page 1, line 26 to page 2, line 3 in the above-identified patent application which states:

Left to run at its inherent frequency, the human biological clock that is responsible for the generation of circadian rhythms exhibits a daily periodicity of slightly longer than 24 hours. Thus, a daily correction to the clock must be made for our internal rhythms to remain synchronized or ‘entrained’ to the natural 24 hour day. It is widely accepted that exposure to the natural light/dark cycle provides the strongest signal to entrain the human circadian system to the geophysical day. Inadequate exposure to light of sufficient intensity is a contributing factor in disorders associated with biological rhythm disturbance, such as seasonal affective disorder (SAD), jet lag from transmeridian travel, shift work and some types of

insomnia (advanced and delayed sleep phase syndromes). Timed exposure to artificial bright light to the eyes has been used successfully to treat such disorders. Some examples of studies relating to the effects of timed ocular exposure to artificial bright light are discussed in U.S. Patent Nos. 5,167,228 and 5,176,133 to Czeisler, which are herein incorporated by reference

Accordingly, as set forth above and in Campbell Declaration ¶4 a method for resetting a human circadian clock has a substantial and well established utility in treating disorders associated with a biological rhythm disturbance. Additionally, as described in pages 3-6 in the Summary of the Invention in the above-identified patent application and in Campbell Declaration ¶4, a method for resetting a human circadian clock has a substantial and well established utility of enhancing alertness and performance.

Applicants also respectfully direct the Office's attention to page 9, line 10 to page 16, line 22 in the above-identified patent application, provide several detailed, documented examples of using the method to reset the circadian clock via a non-ocular pathway in accordance with the present invention. These examples clearly describe how one of ordinary skill in the art could practice the present invention.

Further, the study set forth in "Absence of Circadian Phase Resetting in Response to Bright Light Behind the Knees" by Wright Jr. and Czeisler (Science Magazine 297 (5581):571) ("Czeisler Science Magazine Article") is not a replication of the work set forth in the above-identified patent application. Campbell Declaration ¶5. The suggestion in the Czeisler Science Magazine Article that ocular exposure to light is required for resetting the circadian clock is contradicted by our findings as set forth in the above-identified patent application and in our publications: Campbell SS and Murphy PJ, "Extraocular Circadian Phototransduction in Humans," Science, 279:396-399, 1998; Campbell SS and Murphy PJ, "Circadian Clock Resetting In Humans By Extraocular Light Exposure," Biological Effects of Light, 1998, edited by MF Holick and EG Jung Boston, Kluwar Academic Publishers, 389-395, 1999; Campbell SS, Murphy PJ and Suhner A, "Extraocular Phototransduction And Circadian Timing Systems In Vertebrates," Chronobiology International, 18(2): 137-172, 2001; and Murphy PJ and Campbell SS, "Enhancement of REM sleep during extraocular light exposure in humans," American Journal of Physiology, 280: R1606-R1612, 2001 Campbell Declaration ¶6. Accordingly, in view of the foregoing remarks, the Office is

respectfully requested to reconsider and withdraw the rejections under 35 U.S.C. 101 and 35 U.S.C. 112, first paragraph.

The Office has rejected claims 53-57 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,304,212 to Czeisler et al. (“Czeisler ‘212”), rejected claims 53, 54, 56 under 35 U.S.C. 102(b) as being anticipated by Czeisler et al., “Suppression of Melatonin Secretion in some Blind Patients by Exposure to Bright Light” (New England Journal of Medicine, Vol. 332:6-11 January 5, 1995) (“Czeisler Journal of Medicine Article”), and has rejected claims 55 and 57 under 35 U.S.C. 103(a) as being unpatentable over the Czeisler Journal of Medicine Article in view of Czeisler ‘212. The Office asserts that Czeisler ‘212 discloses a system comprising a temperature measuring system (lines 30-54 of column 13) and non-solar photic stimulation generating system (lines 20-65 of column 62) that activates upon an assessed time to adjust the circadian cycle of a human. The Office asserts that with regard to the positioning of the non-solar photic stimulation device, Figure 39B and lines 54 of col. 64 through line 25 of col. 65 disclose positioning such that non-ocular regions are exposed. The Office further asserts the Czeisler article discloses a method of resetting a human circadian clock by exposing non-ocular regions with non-solar light. The Office asserts a temperature measuring system is disclosed to assess the minimum temperature and exposure times were at 22-23 hrs after the initial temperature minimum, which would also be before the subsequent assessed minimum. The Office acknowledges that the Czeisler Journal of Medicine Article lacks the express written disclosure of applying light about six hours before or after the assessed time, but the Office asserts Czeisler ‘212 teaches in line 59 of col. 39 to line 9 of col. 40, figure 11, and figure 15b that it is well known to apply light according to an assessed time related to temperature minimums in order to reset the circadian clock.

Neither Czeisler ‘212 nor the Czeisler Journal of Medicine Article, alone or in combination, suggest or disclose “a non-solar photic stimulation generating system positioned to expose a non-ocular region, but not a substantially ocular region of a human subject to a non-solar photic stimulation during one or more circadian cycles” as recited in claim 53. As the Office has acknowledged, “Czeisler ‘212 discloses exposing both a substantially ocular region and a substantially non-ocular region to light.

The Office's attention is respectfully directed to col. 62, lines 24-38 in Czeisler '212 states that, "In particular, electric lights of either incandescent or fluorescent type can produce light of sufficient intensity when large numbers of them are concentrated on a surface. A wall eight feet high and ten feet wide covered with conventional fluorescent lamps spaced two to three inches apart (3800-5800 watts) will create illumination sufficient to expose a person to 9,500 lux, measures of the pupil of the subject, at a distance of ten feet or so if the person's gaze is directed at the wall. . . . Thus the light is diffuse enough that a person can stare directly at the glowing lamp from any distance without discomfort." Accordingly, Czeisler '212 is disclosing exposing both a substantially ocular region and a non-ocular region to illumination.

Additionally, the Office's attention is respectfully directed to FIG. 39b and col. 63, lines 17-26 in Czeisler '212 which states, "An alternative to large light banks are smaller lights placed closer to the user (FIGS. 39A, 39B, 39C) . . . Halving the distance between the lights and the user allows halving each dimension of the array and quartering the total light output while producing the same light incident to the user's eye" (Emphasis added). Again, Czeisler '212 is clearly disclosing exposing both a substantially ocular region and a non-ocular region to illumination.

Further, the Office's attention is respectfully directed to col. 5, lines 61-65 in Czeisler, "Based on this assessment of phase and amplitude resetting capacity, the method of administering a regimen of bright light (and advantageously darkness) according to the present invention efficiently adjusts the circadian phase to a new, desired phase and amplitude." Accordingly, the discussion at col. 64, line 31 to col. 65, line 26 in Czeisler '212 is merely a discussion of the application of a period of darkness. As described at col. 62, line 16 to col. 64, line 30 and throughout Czeisler '212, it is the administration of light to a subject's retina which is used to reset that subject's circadian cycle. Therefore, Czeisler '212 discloses exposing both a substantially ocular region and a non-ocular region to illumination, but does not teach or suggest exposing a non-ocular region, but not a substantially ocular region to non-solar photic stimulation.

Referring now to the Czeisler Journal of Medicine Article, Applicants respectfully direct the Office's attention to the last paragraph on page 6 continuing to the first paragraph on page 7 which states, "Retinal exposure to light produces short-term suppression

of nighttime melatonin secretion in sighted human subjects in an intensity-dependent manner. Since the only known photic input governing melatonin synthesis in the mammalian pineal gland is conveyed through the suprachiasmatic nucleus, losing light input to this light nucleus should preclude the suppression of melatonin secretion.” Additionally, the heading under FIG. 3 on page 10 of the Czeisler Journal of Medicine Article states, “The plasma melatonin concentrations did not fall during the bright-light exposure when the blindfold was in place (left-hand panel), but they fell abruptly during the exposure when the patient’s eyes were not blindfolded (right-hand panel).” Both of these paragraphs reveal the Czeisler Journal of Medicine Article’s reliance on ocular exposure for resetting a human circadian clock. Nowhere does Czeisler Journal of Medicine Article teach or suggest exposing a non-ocular region, but not a substantially ocular region to non-solar photic stimulation.

As set forth on page 4, lines 3-5 in the above-identified patent application, “The present invention is premised on the unexpected result that substantially non-ocular presentation of appropriately timed light in humans can induce circadian clock resetting.” Additionally, as discussed on page 4, lines 14-25 of the above-identified patent application, exposing a substantially non-ocular region, but not a substantially ocular region provides a number of advantages, such as reducing eye fatigue and allowing normal routines, such as sleep, to take place without interruption. Accordingly, in view of the foregoing remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claim 53. Since claims 54-57 depend from and contain the limitations of claim 53, they are distinguishable over the cited references and are patentable in the same manner as claim 53.

The Office has rejected claims 53-57 under 35 U.S.C. 103(a) as being unpatentable over Vreman et al. US Patent No, 6,350,275 in view of Czeisler ‘212. Applicants respectfully traverse the Office’s rejection because Vreman is not prior art with respect to the above-identified patent application. The above-identified patent application is a divisional of U.S. Patent Application Serial No. 09/074,455, filed May 7, 1998, now U.S. Patent No. 6,135,117, which claims the benefit of U.S. Provisional Application No. 60/046,188 filed May 12, 1997 and U.S. Provisional Application No. 60/072,121 filed January 22, 1998. As a result, the earliest filing date for the above-identified patent application is prior to the earliest filing date for Vreman. As discussed in greater detail earlier, Czeisler ‘212 does not teach or suggest the claimed invention. Accordingly, in view

of the foregoing remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 53-57.

In view of all of the foregoing, applicant submits that this case is in condition for allowance and such allowance is earnestly solicited.

Respectfully submitted,

Date: June 1, 2004

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